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ABSTRACT

The computer center of the University of Iowa is the topic of this informal panel presentation. The present structure of the facility is described in terms of batch and remote terminal services. The job scheduling method used is shown to provide acceptable turn-around times, but usage is unexpectedly low, in spite of the low cost to student users. Plans for a large number of remote terminals are reviewed, and the allocation of terminals to departments within the university is described. Finally, a line drawing showing the interconnections between the main processor, the small minicomputers, and the remote terminals is provided. (WDB)

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Trends in Instructional Use of Computers

A Panel Discussion
Presented at
the EDUCOM Fall Conference
Princeton, New Jersey
October 11, 1973

G.P. Weeg

Two preliminary comments: the expected surge in the instructional use of computing seems to have plateaued; and second, I think that is because perhaps the Lord is aligned against us. At an ecumenical service which I attended a few weeks ago, the minister prayed that America be delivered from the ills which beset it: Watergate, pollution, crime in the streets, and the computerized society.

Several of the questions listed in the description of this panel are under experimentation at the University of Iowa today. In particular:

1) How should educational computer use be delivered;

2) Should there be separate computer budgets for departments and courses;

3) Will free-access lead to bankruptcy;

4) Is time-sharing essential?

Iowa's computing center has always been a centralized facility, except for on-line laboratory centered computers which are found in some two dozen laboratories. Our facility has been principally batch oriented, although we have some 80 or 90 interactive terminals located on campus.

To provide for student usage we have in the past couple of years made available our so-called super-batch system. This consists of running several special classes namely, CLASS=T,U,V,W,X, which run:

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CLASS W=WATFIV=FORTRAN
CLASS X=PL/C=PL/1
CLASS V=ASSEMBLER G=360 ASSEMBLER
CLASS T=SPITBOL=SNOBOL
CLASS U=WATBOL=COBOL
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Every fifteen minutes all jobs of any of these classes are taken in from the job queue and the corresponding in-core compiler run for all jobs of that class. With such a system our turn-around time for the most popular, WATFIV, is about eight minutes. With handling, the effective turn-around varies from half-hour to an hour. We run about 600 to 1,000 jobs in the WATFIV class in typical recent days, with peaks up to 1,500 jobs in a day.

Yet with this service we estimate that no more than 20% of our classes make use of the computer for instructional purposes. Is this low percentage due just to the fact that we are batch oriented? Probably not. Believing this, we have mounted a strong educational effort to induce faculty members to see the value of computing as a supplement to instruction.

However, as a result of the study* made by Weingarten, Nielsen, Whiteley and myself on Regional Computer Networks, I have become more than a little convinced that the mode of computing does affect the quality of instructional computing. In particular, our observations at Dartmouth, a university of some 3,500 students, showed that in their peak months some 1,700 students logged on the computer, and that in the total year, just over 3,000 students logged on. Clearly a great number of parameters can cause such a significant involvement of students with the computer, but equally clearly the omnipresence of time-

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*Weingarten, Nielsen, Whiteley, Weeg, A Study of Regional Computer Networks, Computer Center, Univeristy of Iowa, Iowa City, Iowa, 1973

sharing terminals on that campus must be a contributing factor. Moreover, with a broad variety of languages available, BASIC represents 90% of the usage.

At Iowa, then, we are in the process of rethinking our computer delivery system. For the past three years, we have had collegiate computer fund allocations, which in turn were parcelled out to departments, and from there to individual courses and instructors. Yet, there has been no convenient way to parcel those funds out to the student, for whom lest we forget, the university exists. The system if fiscally satisfactory, but it in no way contributes to the instructional use of computing.

We have concluded, for a large number of reasons, to back off and start over. Our principal new tenets are:

1. Instructional computing implies time-sharing conversational computing.
2. Instructional computing should be free to the student.
3. A single simple language, BASIC, will handle the bulk of the instructional need.

From our study, mentioned earlier, we are able to conclude that six teletype terminals can serve 250 students who receive one assignment per week requiring the use of the computer. Applying this logic to the University of Iowa with 20,000 students, and aiming for eventual 50% student utilization, it follows that a minimum of 240 terminals are required if we are to stimulate an instructional computer revolution. As a matter of fact we are prepared to think in terms of an ultimate thousand terminals on campus.

How can such massive computing be provided in these parlous times? We are first of all convinced that if there is a large computer which has the potential of supporting 250 to a thousand terminals that we would have no

chance of finding the capital to acquire it. Moreover, after surveying the field, we doubt that such a system exists. But we have observed the mini-computer market and how it grows: faster, more capable and cheaper as the days go by.

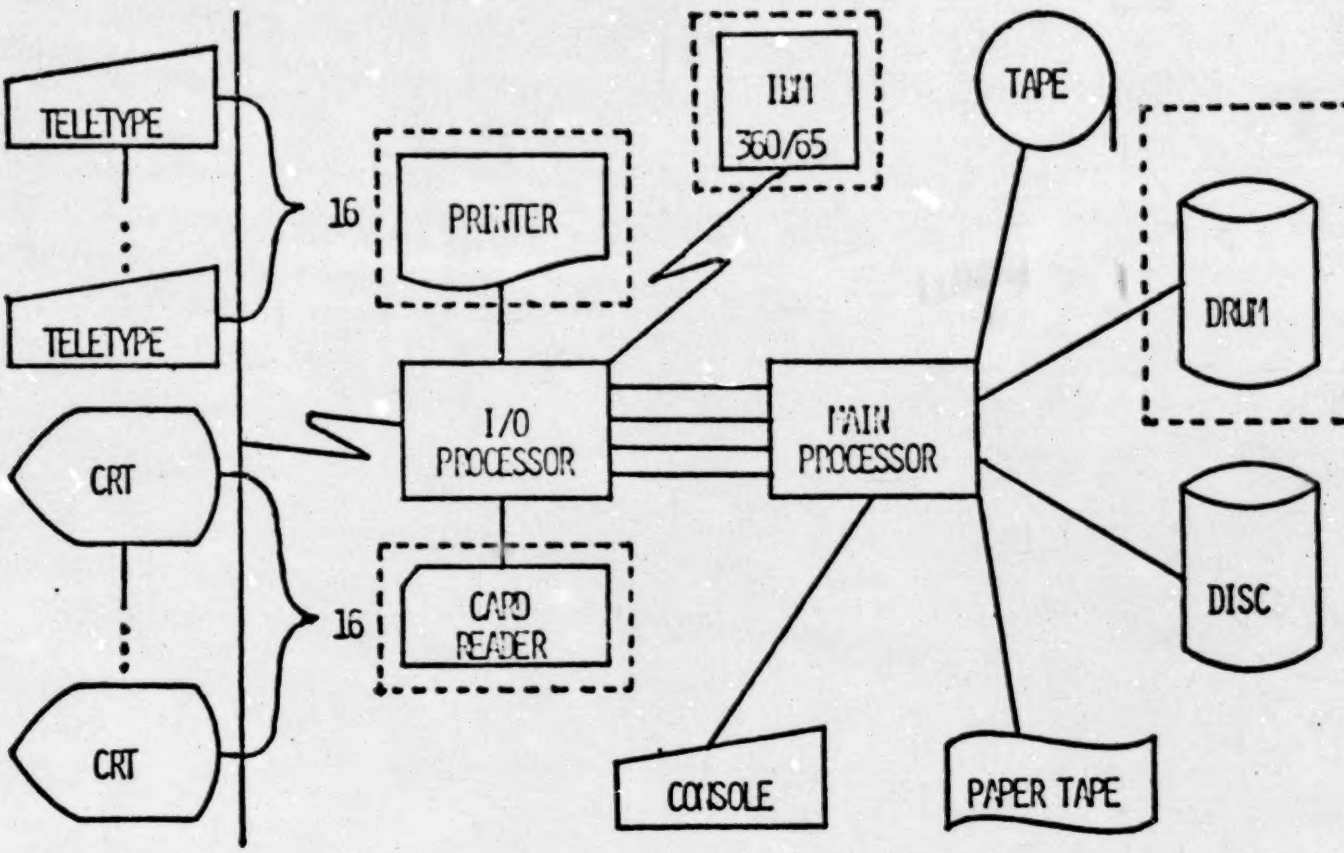
Leaving lots of arguments un-argued, and hosts of meetings undescribed, we at Iowa have decided to attack instructional computing by way of distributed computing. We intend to place on our campus ten, twenty, or more mini-computers, all interfaced to our central computer, the IBM 360/65 or whatever we eventually replace it by, to present more conversational programming capability to our students. The bulk of the student time-sharing load will be handled by the mini-system itself. We intend to accompany this with a strong effort to train our faculty in the use of such equipment.

At present we have two HP 2000F mini-computers on campus, and within a few weeks we will have the third one. Since last spring, we will have increased the number of terminals available to our students from zero to 96 in the very near future.

Two details should be mentioned: We are conducting a tightly controlled experiment on the first installations. Sixteen terminals are in the College of Business Administration; eight each in Education and the Social Sciences. The Business College has an enrollment of about 800, hence, we believe that College is nearly computer saturated. How this college works out is crucial to continued development. We hope to place 32 terminals in Statistics for use in consolidating our some two dozen introductory courses in Statistics. And sixteen will go to Dentistry, with sixteen remaining to be assigned.

The physical arrangement is that the mini's are all located in our new computer building in our new computer room.

The following schematic shows how we are connecting the mini's to the 360.



UNIVERSITY OF IOWA
HP 2000F TIMESHARING SYSTEM

Our intentions are to use the connection to provide file back up; RJE into our batch system; and access to the time-sharing systems of the 360.

This is a brief summary of our position on the questions posed by this panel. I would be happy to provide greater detail later.